

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A sliding structure of a shaft member in which a shaft member is retained slidably in a guide hole, wherein a plurality of labyrinth grooves are formed in both axial end portions of the side surface of the shaft member which are located in an area, which are always in slidable contact with a side surface of the guide hole, and wherein an intermediate portion of the shaft member between said axial end portions has a substantially constant outer diameter that is free of grooves, and
wherein a distance between an end of the shaft member and a first groove of the labyrinth grooves nearest to the end of the shaft member is 0.1 to .8 mm.

2. (Currently amended) An injector having a needle which is inserted into a nozzle supplied with a fuel for injection, is made up of a shaft member retained slidably in a guide hole formed in the nozzle wall and displaced in the axial direction to switch between fuel injection and termination of fuel injection;

wherein a plurality of labyrinth grooves are formed in both axial end portions of the side surface of the shaft member which are located in an area, which are always in slidable contact with a side surface of the guide hole, and

wherein an intermediate portion of the shaft member between said axial end portions has a substantially constant outer diameter that is free of grooves, and
wherein a distance between an end of the shaft member and a first groove of the labyrinth grooves nearest to the end of the shaft member is 0.1 to .8 mm.

Claim 3. (Canceled).

4. (Previously presented) The sliding structure as set forth in claim 1, wherein a groove pitch of the labyrinth grooves is 0.1 to 1.0 mm.

5. (Previously presented) The sliding structure as set forth in claim 1, wherein the number of the labyrinth grooves at each end portion is 3 to 5.

6. (Previously presented) The sliding structure as set forth in claim 1, wherein a groove width of the labyrinth grooves is equal to or less than 0.6 mm.

7. (Previously presented) The sliding structure as set forth in claim 1, wherein said intermediate portion has an axial length greater than an axial length of either of said grooved axial end portions.

Claim 8. (Canceled).

9. (Previously presented) The injector as set forth in claim 2, wherein a groove pitch of the labyrinth grooves is 0.1 to 1.0 mm.

10. (Previously presented) The injector as set forth in claim 2, wherein the number of the labyrinth grooves at each end portion is 3 to 5.

11. (Previously presented) The injector as set forth in claim 2, wherein a groove width of the labyrinth grooves is equal to or less than 0.6 mm.

12. (Previously presented) The injector as set forth in claim 2, wherein said intermediate portion has an axial length greater than an axial length of either of said grooved axial end portions.

13. (Currently amended) An injector having a needle, which is inserted into a nozzle supplied with a fuel for injection and is displaced in the axial direction to switch between fuel injection and termination of fuel injection,

a valve chamber provided with a valve body for isolating a back pressure chamber from a low-pressure source provided in a low-pressure flow path for releasing to the low-pressure source ~~the fuel~~ fuel in the back pressure chamber, to which a high-pressure fuel is supplied and which generates a back pressure of the needle, and

a piston, which is made up of a shaft member ~~and presses that presses against~~ the valve body, and is retained slidably in a guide hole, wherein a plurality of labyrinth grooves are formed in both axial end portions of the side surface of the shaft member which are located in an area, which are always in slidable contact with a side surface of the guide hole, and wherein an intermediate portion of the shaft member between said axial end portions has a substantially constant outer diameter that is free of grooves, and

wherein a distance between an end of the shaft member and a first groove of the labyrinth grooves nearest to the end of the shaft member is 0.1 to .8 mm.

Claim 14. (Canceled).

15. (Previously presented) The injector as set forth in claim 13, wherein a groove pitch of the labyrinth grooves is 0.1 to 1.0 mm.

16. (Previously presented) The injector as set forth in claim 13, wherein the number of the labyrinth grooves at each end portion is 3 to 5.

17. (Previously presented) The injector structure as set forth in claim 13, wherein a groove width of the labyrinth grooves is equal to or less than 0.6 mm.

18. (Previously presented) The injector as set forth in claim 13, wherein said intermediate portion has an axial length greater than an axial length of either of said grooved axial end portions.